

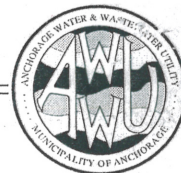
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12/30/08



Municipality of Anchorage

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Mayor Mark Begich

Anchorage Water & Wastewater Utility Treatment Division

September 16, 2004

U.S. Environmental Protection Agency, Region 10
NPDES Compliance Unit
1200 Sixth Avenue, OW-133
Seattle, Washington 98101



Subject: Bioaccumulation Study - NPDES Permit No. AK-002255-1

The John M. Asplund Water Pollution Control Facility has a requirement to conduct a bioaccumulation study in the summer during the fourth year after the effective date of the permit (permit section I.B.6., page 9 of 39). The sampling shall be coordinated, to the extent practicable, with the sampling times for the water quality monitoring program and the sediment analysis. The bioaccumulation program was to include sampling of the yellow-green algae *Vaucheria* spp. from two intertidal locations, one in the vicinity of the outfall and one at a control location across Knik Arm from the outfall. However, due to insufficient algae growth during the summer of 2003, the bioaccumulation program could not be performed and was postponed until 2004. Similar conditions to that seen in 2003 have continued in 2004, with very little algae seen in the intertidal area.

This letter is to inform EPA that the bioaccumulation study, as required by the permit, cannot be performed. We propose that an alternative study be conducted in September or October of this year to meet the permit objectives and provide information for the permit renewal application due in February 2005. Bioaccumulation testing would be conducted on fish and/or shrimp collected from the subtidal area with a beach seine. The attached document outlines the history of the bioaccumulation program, why the permit study could not be performed, the reasoning behind the proposed alternative, and details of the proposed study.

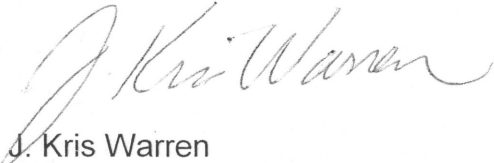
We would appreciate a quick response from EPA to this proposal for an alternate study, so that the study can be conducted prior to winter.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Community, Security, Prosperity

I can be contacted by phone at (907) 564-2799 or via email at Kris.Warren@awwu.biz should you have any questions.

Sincerely,



J. Kris Warren
Manager, Treatment Division - AWWU

Cc: ✓ Michael Lidgard, Unit Manager, NPDES Permits Unit, EPA Region 10, Seattle
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Mark Savoie, Kinnetic Laboratories Inc., Anchorage Office
Noel Williams, CH₂MHill, Sacramento Office

Enclosure: Bioaccumulation Monitoring Summary, 3 pages



Bioaccumulation Monitoring Program

John M. Asplund Water Pollution Control Facility

NPDES Permit No. AK-002255-1

The NPDES permit for the Municipality of Anchorage's Asplund Wastewater Treatment Facility (WWTF) requires that a bioaccumulation program be conducted during the fourth year of the Permit. The bioaccumulation program was to include sampling of the yellow-green algae *Vaucheria* spp. from two intertidal locations, one in the vicinity of the outfall and one at a control location across Knik Arm from the outfall. However, due to insufficient algae growth during the summer of 2003, the bioaccumulation program could not be performed and was postponed until 2004. Similar conditions to that seen in 2003 have continued in 2004, with very little algae seen in the intertidal area. These algae are normally associated with brackish water and often are present near high tide level near river mouths or in areas of seepage and runoff of freshwater (Kozloff, 1993). Since both the summer of 2003 and 2004 were relatively dry with low runoff, it is speculated that the surface waters of Upper Cook Inlet in the vicinity of Anchorage were higher in salinity than normal with little runoff and seepage onto the mudflats, which inhibited the normal growth of this algae. Summer (June-August) rainfall in Anchorage measured at the Anchorage International Airport was 20.5% below normal in 2003 and 47.3% below normal in 2004. The mud-flats near the outfall were observed throughout both summers, and the extensive mats of *Vaucheria* spp. that normally grow each summer were never present during either 2003 or 2004. A thin layer of algae was observed at the intertidal locations in June 2004 during the receiving water sampling, but this had disappeared by mid-July with the lack of rain and low runoff. It was hoped that the algae mats would form later in the summer when precipitation is typically higher, but fairly dry and sunny conditions prevailed through July and August with only a few days of rainfall each month.

Background History

As part of the original 301(h) waiver from secondary treatment and the NPDES Permit for the Asplund WWTF, which became effective 16 October 1985, a bioaccumulation program was to be undertaken to determine if pollutants from the discharge were accumulating in biological organisms exposed to diluted wastewater. During the first year (1986) of the monitoring program under this Permit, a preparatory bioaccumulation program was performed to determine whether a laboratory or field program should be conducted. This program involved the following three components:

- Analysis of the benthic macro-invertebrate data that was collected in 1986 to determine if a suitable test species were available in sufficient quantities for chemical analyses;
- Review of pertinent bioaccumulation, bioassay, and algal ecology literature to determine if locally abundant intertidal macroalgae, in particular *Vaucheria longicaudis* and *Enteromorpha* spp., were suitable indicators of bioaccumulation; and
- Review of literature on various static and continuing bioassay methods for locally occurring species in order to formulate and develop costs for a laboratory exposure approach and to design a bioaccumulation study based on information obtained in these components.

Results of the preparatory bioaccumulation program conducted during 1986 indicated the presence of a very sparse intertidal benthic invertebrate community with insufficient biomass to conduct a field bioaccumulation assessment. The literature review indicated the macroalgae *Vaucheria* spp. had not been used historically as a field indicator of bioaccumulation, but was usually available in sufficient quantity to make this approach feasible. The use of the macroalgae required that an assumption be made that environmental variables that can significantly affect bioaccumulation do not differ significantly at control and exposure sites, or that these variables must be measured and their affects on bioaccumulation determined. A laboratory exposure approach was also determined to be feasible using a species that was native to Cook Inlet, although not in abundance in Knik Arm. Although the laboratory approach uses established methods and organisms, it greatly reduces the influence of environmental factors such as high currents and turbidity which are unique to Cook Inlet and Knik Arm.

Results of the preparatory program were presented in the 1986 Asplund WWTF Monitoring Program Annual Report. Based on the literature survey and field results collected during 1986, it was recommended to EPA that a field bioaccumulation study be undertaken in order to take into consideration the unique environmental factors of Cook Inlet. This program was carried out in early August of 1987, when there was an abundant growth of algae in the intertidal area within Knik Arm. No meaningful pattern of bioaccumulation was indicated by the data. Some constituents were found to be statistically significantly different between the control and outfall sites; however, of those, most were found to be higher at the control rather than at the outfall site and were not due to the effluent discharge. In summary, it was concluded that no bioaccumulation of pollutants from the Asplund discharge was indicated by the study.

Recommendation

In the absence of any macroalgae to perform the NPDES Permit-required bioaccumulation study, it is proposed that an alternative method be utilized to fulfill the Permit objectives. As previously discussed, although a laboratory exposure approach utilizes established protocols and has a well-developed basis for comparison, the unique receiving water characteristics of Knik Arm cannot be taken into account using this approach. The question of whether there are pollutants in the effluent is already being addressed as part of the effluent monitoring program, so the only thing a laboratory study would determine is whether those pollutants could bioaccumulate and not whether they do in Knik Arm. Based on this, we would recommend that a field approach still be utilized.

One possible approach that had not been previously considered for this Permit requirement would be to collect either fish and/or shrimp from the subtidal area with a beach seine. For fish, a species of demersal fish (those that live on or near the bottom) would be targeted. Beach seine data obtained in Knik Arm by Dames and Moore (1983) represent all that is known about demersal fish in the area. In that study, they found five species of demersal fish: saffron cod (*Eleginus gracilis*), ringtail snailfish (*Liparis rutteri*), starry flounder (*Platichthys stellatus*), yellowfin sole (*Pleuronectes asper*), and Pacific staghorn sculpin (*Leptocottus armatus*). Of these, the saffron cod were the most commonly caught and would be the most likely target species, although it is likely that these were misidentified and were actually juvenile pacific cod (*Gadus macrocephalus*), which are much more abundant in Cook Inlet. The most abundant fish found overall was the three-spine stickleback (*Gasterosteus aculeatus*), which is a pelagic species and

probably would not be appropriate for the bioaccumulation study due to it being highly motile. Two species of shrimp were also obtained in the beach seines: the California bay shrimp (*Crangon franciscorum*) and the Alaska bay shrimp (*Crangon alaskensis*). Based on these data, along with results of a limited beach seining effort performed in Knik Arm by MOA as part of the site-specific water quality criteria development for this Permit in 1998, it would appear that either the cod or shrimp would be a good target species. Final selection of the biota to be analyzed would be based on the results of the beach seining effort.

The original design called for the collection of 10 replicate algae samples from each of the two sampling locations (control and outfall). Due to the low abundance and small size of the fish or shrimp expected in the beach seines, it is proposed that instead, three to five replicates be obtained from each of the two sites. Each replicate would consist of 20-50 individual fish or shrimp that would be composited and homogenized into a single replicate. Fish tissue would be analyzed as full body burden which would be representative of how the tissue and potential contaminants would enter the food chain, whereas the shrimp would be analyzed as only the body tissue without the head and carapace to minimize the presence of trapped sediment. Tissue will be analyzed for those priority pollutants that are normally seen to bioaccumulate and which have been present in the Asplund WWTF effluent: thirteen metals, cyanide, semivolatile organic compounds, total hydrocarbons, and pesticides. It is proposed that this sampling take place in either September or October of this year in order to meet Permit requirements and to provide data for Permit renewal purposes.

References

- Dames and Moore. 1983. Marine Biological Studies. Technical Memorandum No. 15. Prepared for EMPS-Sverdrup, U.S. Department of Transportation Federal Highway Administration and Alaska Department of Transportation and Public Facilities, Anchorage, AK.
- Kozloff, E.N. 1993. Seashore Life of the Northern Pacific Coast, *an Illustrated Guide to Northern California, Oregon, Washington, and British Columbia*. Univ. of Washington Press. 370 pp.